3 POWER REQUIREMENT STUDY

THE PIONEER COOPERATIVE ASSOCIATION, INC.

KANSAS 44 GRANT

(Revised)



Prepared by
Program Analyst
Office of the Administrator
RURAL ELECTRIFICATION AIMINISTRATION

June 1952

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POWER REQUIREMENT STUDY 1/

KANSAS 44 GRANT (Revised)

Foreword

This study has been prepared by the Rural Electrification Administration for use in determining the present and estimated future power requirements of The Pioneer Cooperative Association, Inc. (Kansas 44 Grant).

The estimates of future loads contained in the study have been arrived at from a field survey in the Cooperative's area and from basic data obtained in the Cooperative's office. The estimates of kwh consumption for farm, nonfarm and town residential consumers used herein are based upon a projection of historical trends in consumption, type of farm, income, competitive sources of energy, and other economic factors which are believed to have a bearing on the future use of electricity in this area.

The estimates of average unit kilowatt demands per consumer at peak load, corresponding to the estimated average kilowatt-hour consumption per member per month of farm, nonfarm and small commercial consumers, have been derived from the curve "Maximum Demand at Substation" accompanying Engineering Memorandum No. 94R5 of the Engineering Division, REA, dated August 21, 1950. The total number of consumers to be served in each substation area, rather than the number of consumers in a particular class, was used as a basis in arriving at the total and unit demands in order to reflect the probable overall diversity between classes of consumers in a given substation area. No adjustment for a power factor less than unity was applied, it being assumed for estimating purposes that the KVA demand as read from the curve was equal to the KW demand at the substation.

Summary and Conclusions

Pertinent information reflecting the data and conclusions arrived at regarding the present and future number of consumers, kilowatt-hour requirements, and kilowatt demands for The Pioneer Cooperative Association, Inc. (Kansas 44 Grant) are included in the attached Tables I to VI, inclusive.

Table VI (Summary of Power Requirements) indicates that approximately 2,882 consumers will be served by the Cooperative in 1954, 2,930 in 1957, and 3,088 in 1962, at an estimated maximum demand at substation of 3,076 kilowatts in 1954, 3,473 kilowatts in 1957, and 4,007 kilowatts in 1962. Likewise, it is estimated that the Cooperative's annual energy requirements at substations will approximate 12.1 million kilowatt-hours in 1954, 13.8 million kilowatt-hours in 1957, and 16.1 million kilowatt-hours in 1962.

Based on office revision conducted by K. O. Peters, Engineer, Office of the Administrator, REA, USDA.

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The extinctes of future loads contained in the cita, onve best arrived at from a field server in the Comparative's area and from best data obtained in the Comparation of his consumption for fare, its fear and tour residential consumers used herein are based when a majeration of historical breads in consumers, type of farm, indeed, nowabilitive sources of coors, and other sources of coors, and other sources in the historical to the security is the area.

The ustinates of nverue unit hilowalt depends or a consumption per nonecorresponding to the extinated overue dilocated, our consumption per nonebest per combb of here, verient and avail commercial communes, have been
derived from the owner "Heatham Located to Communes, have been
derived from the companies of the Instance in the State of the Substitution of Angert 21,
1950. The total number of consumers to be sirved in each substitution area,
thanks in an initial at the total and that damages in order to reflect the
probable overall diversity between classes of the consumer in a river substato total error of consumer for a gover leate then unity was applied,
the total error and extinct the particular distribution as two replied.

It total error areas for the KW denset at the UVA demand as well tree
to car corre and enter to the KW denset at the Substation.

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Fortless t interrution reflecting the date and conclusions extired at record, in the present and interest of concurrent, interests and interests the Pieneer Societies Association, The. (Normal Grant) are included in the Standard Tubies I to VI, inclusive.

Tails VI (Standary of Power Requirements) indicates that approximately 3,852 consciuency will be corved by the compensitive in 1954, 2,950 in 2567, and 3,856 in 1955, at an extinuted extend at acceptant at acceptant at 2,076 tilevets in 1955, 3,676 tilevets in 2,677 tilevets in 1955, and 4,007 tilevets in 1955, at attention it is noticed that the contract tile approximate that the contract and 15.1 million allowate-accept in 1957, and 15.1 million allowate-accept in 1957, and 15.1 million allowate-accept in 1957, and 15.1 million allowate-accept in 1957.

1/ Bused on office revision conducted by N. C. Poters, Ingineer, Office of the Administrator, NEA, USDA.

The degree of attainment of area coverage by the Cooperative, as well as the achievement of the estimated kilowatt-hour consumption foreseen in this report, are contingent on the following important considerations:

1. An adequate, dependable source of low-cost power supply.

2. Dependable, adequate electrical power to the ultimate consumer with a minimum of interruption in service and

2. Dependable, adequate electrical power to the ultimate consumer with a minimum of interruption in service and at the lowest retail rate commensurate with "pay out" considerations.

3. A fully prosecuted power use program designed to attain the goals of saturation of appliances and farm equipment reflected by the estimates included in this report.

> E. C. Weitzell, Program Analyst

the achieves of phistoness of orea coverage by the Cooperative, as well as

1. An adoquate, dependable neares of low-cost power supply.

- E. Deponiable, adopted a contract of the ultimate and computer of the computer of the contract of the contract of the lowest retail that companies with "pay ont" accompanies companies with "pay ont"
- tally prosecuted peer one program designed to attempt the goals of esturation of speliment reflected by the estimater realisted in this report.

E. O. Welkrell,

TABLE I

COMPARATIVE ANNUAL OPERATING DATA ON CONSUMERS
AND AVERAGE MONTHLY CONSUMPTION

KANSAS	44 GRANT	(REV.)	·						(CONT'D.)
		FARM		TOW	RESIDE	MILL	SMAL	L COMME	RCIAL
YEAR	MEMBERS	AVE		MEMBERS	AVER		MEMBERS	THE RESERVE OF THE PERSON NAMED IN	
-	NO.	KWH/MO.	%INCR.	NO.	KWH/MO.	%INCR.	NO.	KWH/MO	. %INCR.
1946	7	315	on 63	415	65		195	133	==
1947	73	129	40 au	498	7 9	21.5	259	212	59.4
1948	149	163	26.4	618	98	24.1	283	310	46.2
1949	404	150	-8.0	670	1 07	9.2	303	330	6.5
1950	910	166	10.7	762	107	-0-	365	322	-2.4
1951	1,308	197	18.7	878	108	0.9	418	372	15.5
1952 *	1,362	226	w	887	155		418	3 99	***
	YEARLY %								
	- 1951)		47.8			55.7			125.2
AVERAGE	PER YEAR	<	12.0			1101			25.0

^{*} FOUR MONTHS ONLY.

(CONTO ON NEXT PAGE)

PROGRAM ANALYST, OFFICE OF THE ADMINISTRATOR, REA - JUNE 1952

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COMPARATIVE APPLIED OPERATING DATA ON CONSIDERS AND AVERAGE MONTHLY CONSIDERTION

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PROGRAM ANALYST, OFFICE OF THE ADMINISTRATOR, REA - JUNE 1952

TABLE I (CONTID.)

COMPARATIVE ANNUAL OPERATING DATA ON CONSUMERS AND AVERAGE MONTHLY CONSUMPTION

CANSAS 44	KANSAS 44 GRANT (REV.)	EV.)										
	LARGE	LARGE COMMERCIAL	AL	PUB. ST.	& HGWY. LIGHTING	IGHTING	SALES T	SALES TO OTHER REA COOPS	COOPS		TOTAL	
YEAR	MEMBERS	AVERAGE	AGE	MEMBERS	AVERAGE	AGE	MEMBERS	AVERAGE	F.	MEMBERS	AVERAGE	F.
	NO.	KWH/MO.	%INCR.	NO.	KWH/MO.	SINCR.	NO.	KWH/MO.	% INCR.	NO.	KWH/MO.	%INCR.
1946	30	202	ŧ	4	931	1				651	191	1
1947	ķ	513	-27.2	4	393	-57°8				839	133	1.5
1948	12	1,167	127.5	4	715	-44.8				1,066	180	35.3
1949	56	1,485	27.2	4	551	153.9				1,407	194	7.8
1950	43	1,669	12.4	4	1,956	255.0	:-	1,550	i	2,084	206	6.2
1951	31	2,367	41.8	2	1,748	9.01-	-	026*51	:	2,647	233	13.1
1952 *	36	3,308	ı	5	1,481	ı	1	ŀ	1	2,708	263	1
SUM OF YEARLY %1 (1946 - 1951) AVERAGE PER YEAR	SUM OF YEARLY \$INCR. (1946 - 1951) AVERAGE PER YEAR	œ.	181.7 36.3			295.7			1 1			63.9

* FOUR MONTHS ONLY.

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TABLE 11

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COMPARATIVE ANNUAL OPERATING DATA ON ENERGY REQUIREMENTS

ANSAS 44	KANSAS 44 GRANT (REV.)										
	ENERGY	A	ENERGY	*	EMERGY	<u></u>	MAXIMUM	AVERAGE	TOTAL	TOTAL	OVERALL
YEAR	PURCHASED	SED	0708		LOSSES	S	₹	COST	MILES	SERVICES	CONSUMER
	HASH	%INCR.	大型工	%INCR.	XWH.	\$1088	DEMAND	PER GET	ENERGI ZED	CONNECTED	DENSITY
1944 *	127,600	1	93,310	8	34,290	26,9	:	\$.0235	49	4 26	8.69
1945	656,610	i	623,876	4 2	32,734	500	1	*0282	19	536	8.00
1946	1,092,773	57.03	940,372	50°7	92,401	8.9	300	e 0273	75	651	8,68
1947	1,521,953	47 " 4	1,192,417	26.8	329,536	21.7	456	•0259	134	845	6,28
1948	2,418,913	58.9	2,016,168	1°69	402,745	9*91	002	°0193	251	1,072	4.27
1949	4,166,557	7203	3,280,192	62.7	886,465	41.9	1,125	6800	797	1,688	2,12
1950	6,384,964	53.2	5,154,366	57.01	1,230,598	19.3	2,000	-0083	1,514	2,514	1.66
1951	8,963,020	40.4	7,405,713	43.7	1,557,307	17.4	2,562	1200°	1,8733	2,709	1.56
1952 **	3,400,680	1	2,843,955	ŧ	,556,725	16.4	2,300	*000	1,9745	2,722	1.56
IN OF YEARLY & (1944 - 1951)	SUM OF YEARLY \$INCR. (1944 - 1951) AVERAGE PER YEAR	329*5 54°9		310.1		17.9					

* SYSTEM NOT IN OPERATION DURING ENTIRE PERIOD.

** FOUR MONTHS ONLY.

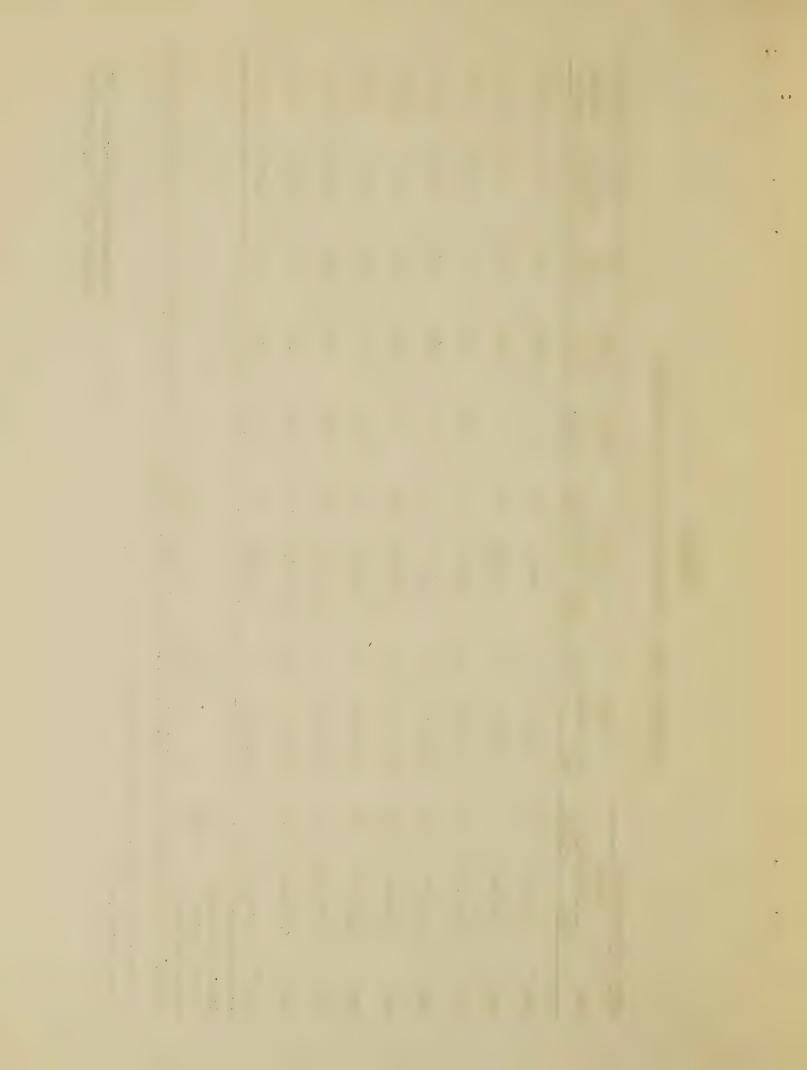


TABLE !!!

ESTIMATE OF LOADS - ULYSSES SUBSTATION AREA

KANSAS 44 GRANT (REV.)									
	NOW	NUMBER OF CONSUMERS	NSUMERS		KIN DE MAND		ANNI	ANNUAL KWH REGILIBENENTS	MFNTS
TYPE OF CONSUMER	1954	1957	1962	1954	1957	1962	1954	1957	1962
				@0*869	066°0®	660-10	03000	@3480	63900
LAKIM	890	006	925	773	891	1,911	2,670,000	3,132,000	3,507,506
TAIR DECIDENT	,			@0.526	60.587	60-705	@1620	@1860	@2340
JUMN RED I DEN I NAL	769	111	837	404	456	590	1,245,780	1,445,220	1,958,580
A SCALLABOO				@1.468	@1.621	@1.849	@5400	00090	0069@
UNALL COMMERCIAL	298	304	314	437	493	581	1,609,200	1,824,000	2,166,600
SOME CELEBO OF LOUIS				@0.722	60,722	@0.722	@2400	@2400	62400
rubilic buildings	80	80	80	58	58	58	192,000	192,000	192,000
TABLE PORMEDO SA	(@25/2,00F	@25/2,0DF	@25/2°00F	@15,000	@15,000	015,000
「ところとのできる」	32	35	38	400	438	475	480,000	.525,000	.570,000
Not TANGED	g d			4	4	,	622,000	Ø22,000	Ø22,000
NOT BE WAT	=	=	=	+	*	*	242,000	242,000	242,000
CASTLANT TRACES				@10/1.1DF	@10/1-1DF	@10/1.1DF	@26,400	@27 \$600	@30,000
SINI FIRE TIME	2	2	~	8	18	18	52,800	55,200	000*09
The state of the s				@225/1.2DF	@250/1.2DF	@250/1.2DF			
N & L CONF. O.A.	-	_	-	188	208	208	1,000,000	1,200,000	1.200.000
APTIAL DEHYDRAFTON				@80/1.2DF	@80/1.2DF	@80/1.2DF			
PRODUCIS CO. (ALFALFA)	-	_	-	67	29	67	275,000	275,000	275,000
SUB-TOTAL							7,766,780	8.890.420	10.271.680
Ditte niet 1000rg January 1							617%	016	@16%
TOO SECOND AND AND AND AND AND AND AND AND AND A							1,591,220	1,693,580	1,956,320
TOTAL	2,084	2,111	2,209	2,345	2,629	3,008	9,358,000	10,584,000	12,228,000
							н		

^{*} DOES NOT OPERATE AT TIME SYSTEM PEAK OCCURS.

ANNUAL LOAD FACTOR -

45.6%

%0*91

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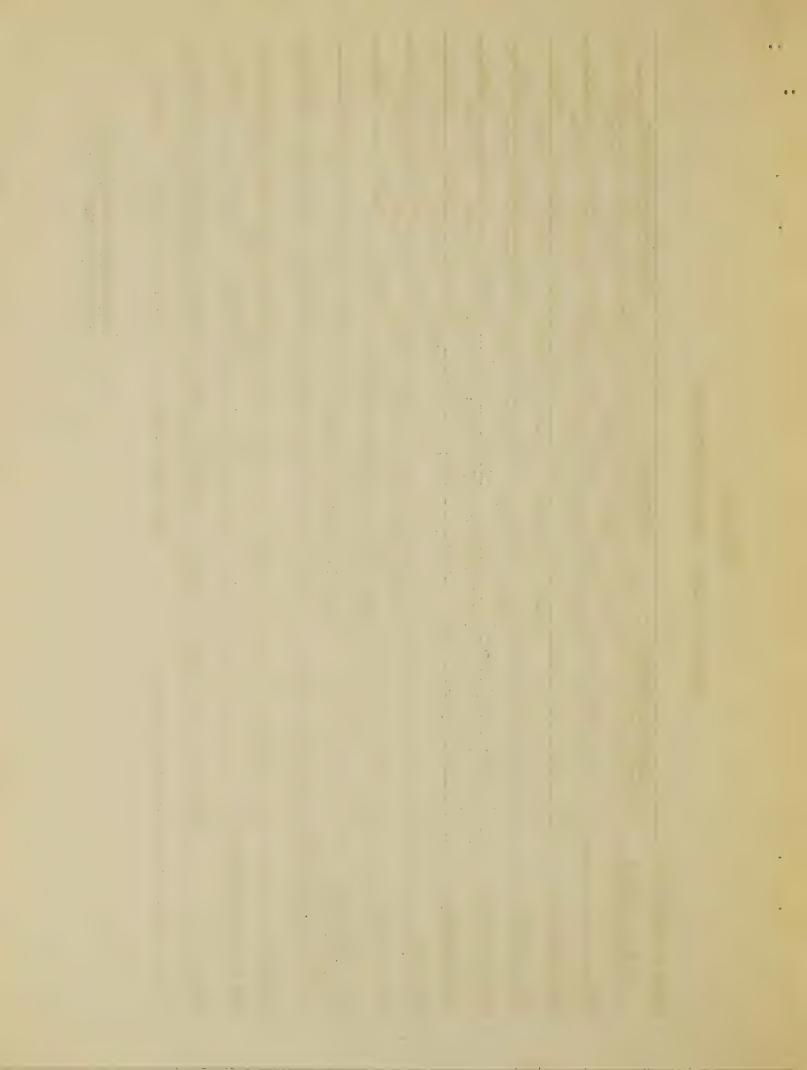


TABLE IV

ESTIMATE OF LOADS - HUGOTON SUBSTATION AREA

KANSAS & GRANT (REV.)									
	NUMBER	NUMBER OF CONSUMERS	UMERS		KW DEMAND		ANNI	ANNUAL KWH REQUIREMENTS	MENTS
TYPE OF CONSUMER	1954	1957	1962	1954	1957	1962	1954	1957	1962
				188709	600-10	201-10	. 0006@	@3480	03900
FARM	541	551	575	477	553	637	1,623,000	1,917,480	2,242,500
				@0.533	@0.595	@0.714	01620	. 09810	@2340
NONFARM (RES.)	194	202	233	103	120	166	314,280	375,720	545,220
				@1 ° 488	@1.643	01.874	@5400	0009@	. 0069@
SMALL COMMERCIAL	24	26	30	96	43	56	129,600	156,000	207,000
				00.731	60.731	@0.731	62400	@2400	@2400
PUBLIC BUILDINGS	30	30	30	22	22	22	72,000	72,000	72,000
				@25/200F	@25/2.0DF	@25/2.0DF	015,000	@15000°	@15,000
LARGE COMMERCIAL	9	7	8	75	88	100	000.06	105,000	120,000
							@22,000	@22,000	052,000
IRRIGATION	-	-	-	*	*	*	22,000	22,000	22,000
				@10/1.1DF	@10/1.1DF	@10/1.1DF	026,400	005,750	030,000
STREET LIGHTING	2	2	2	18	18	18	52,800	55,200	000*09
SUB-TOTAL							089.508.2	2,703,400	3.268.720
							@17%	@164	@16%
PLUS DIST. LOSSES (APPROX.)							472,320	514,600	622,280
TOTAL	798	819	879	731	844	666	2,776,000	3,218,000	3,891,000
* DOES NOT OPERATE AT TIME SYSTEM PEAK OCCURS.	YSTEM PE	AK OCCUR	• on		ANNUAL LOAD FACTOR -	FACTOR -	43.4%	43.5%	44-5%

PROGRAM ANALYST, OFFICE OF THE ADMINISTRATOR, REA - JUNE 1952

TABLE V

ESTIMATE OF LOADS - SUMMARY OF POWER REQUIREMENTS (BY CLASSIFICATION OF CONSUMERS)

KANSAS 44 GRANT (REV.)	NIME	NIMBER OF CONSUMERS	MERC		CAN DETAINABLE		100	A Market Company	
TYPE OF CONSUMER	1954	1957	1962	1954	1957	1962	1954	ANNUAL KISH REQUIREMENTS	MEN 18 1962
	12431	1,451	1,500	1,250	19444	1,548	4,293,000	5,049,480	5,850,000
TOWN RESIDENTIAL	696	616	1,9070	507	576	756	1,560,060	1,820,940	2,503,800
SMALL COMMERCIAL	322	330	344	473	536	637	1,738,800	1,980,000	2,373,600
PUBLIC BUILDINGS	110	110	110	80	80	80	264,000	264,000	264,000
LARGE COMMERCIAL	38	42	46	475	526	575	570,000	000*069	000*069
PUBLIC STREET & HGWY.	4	4	4	36	36	36	105,600	110,400	120,000
IRRIGATION	12	12	12	*	*	*	264,000	264,000	264,000
MP & L GAS COMP. STA.	-	-		188	208	208	1,000,000	1,200,000	1,200,000
PRODUCTS CO. (ALFALFA)	-	gree .	1	29	<i>L</i> 9	19	275,000	275,000	275,000
SUB~TOTAL							10,070,460	11,593,820	13,540,400
PLUS DIST. LOSSES (APPROX.)							2,063,540	2,208,180	2,578,600
	2,882	2,930	3,088	3,076	3,473	4 \$ 007	12,134,000	13,802,000	16,119,000
the state of the s		THE PERSON NAMED IN COLUMN							

^{*} NOT INCLUDED. SYSTEM PEAK OCCURS IN WINTERS

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TABLE VI

ESTIMATE OF LOADS - SUMMARY OF POWER REQUIREMENTS (BY SUBSTATION)

	NUMBE	NUMBER OF CONSUMERS	MERS		KW DEMAND		ANNE	ANNUAL KWH BEON IREMENTS	MENTS
SUBSTATION AREAS	1954	1957	1962	1954	1954 1957 1962	1962	1954	1957	1962
ULYGSES	2,084	2,111	2,209	2,345	2,629	3,008	9,358,000	10,584,000	12,228,000
HUGOTON	198	819	618	121	844	666	2,776,000	3,218,000	3,891,000
TUTAL	2,882	2,930	3,088	3,076	3,473	4,007	12,134,000	13.802.000	000-611-91

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ANNUAL LOAD FACTOR -

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